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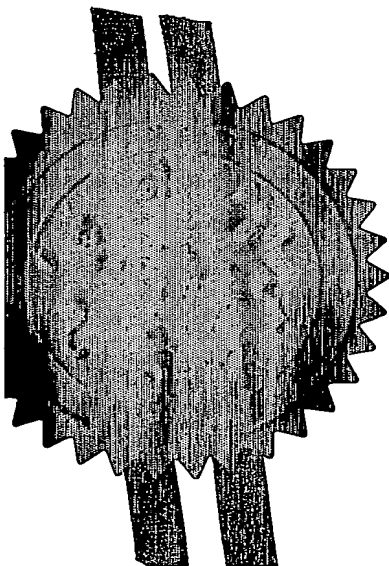
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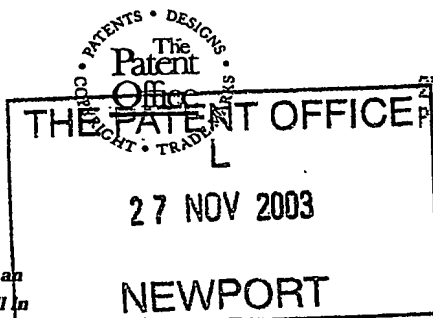
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Dated

9 December 2000

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P01/7700 0.00-0327582.3

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1. Your reference

IAM/EMW/P/25397.GB

2. Patent application number

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0327582.3

3. Full name, address and postcode of the or of each applicant (underline all surnames)

MADISON FILTER 981 LIMITED  
Knowsley Road Industrial Estate  
Haslingden  
Lancashire BB4 4EJ UNITED KINGDOM

Patents ADP number (if you know it)

8043218001

If the applicant is a corporate body, give the country/state of its incorporation

UNITED KINGDOM

4. Title of the invention

FILTER CLOTH RETENTION

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

WILSON GUNN M'CAW  
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M2 7BD

Patents ADP number (if you know it)

7153927001 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if

YES

a) any applicant named in part 3 is not an inventor, or  
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Description 8

Claim(s) -

Abstract -

Drawing(s) 2 + e

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Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11. I/We request the grant of a patent on the basis of this application.

Signature *Ian A. Middlemist* Date 25/11/2003

12. Name and daytime telephone number of person to contact in the United Kingdom Ian A. Middlemist 0161 827 9400

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## FILTER CLOTH RETENTION

This invention relates to improvements in filter cloth retention, particularly for segments of rotary disc filters, and drum filters.

It is known to receive the edge of a filter cloth between flaps formed by separating layers of an edge strip – e.g. by cutting or delamination, and the cloth then secured between the flaps by stitching, adhesive or thermal welding depending on the material used. It is also known to form a bead of resilient material on the edge of the edge strip, for example integrally therewith, and receiving the bead in the channel sectioned strip forming part of the frame of the filter, the channel section advantageously having an opening or slot of smaller size than the diameter of the bead so that the latter is prevented from being pulled out of the channel section by tension exerted on the filter cloth.

The prior art does not lend itself to easy assembly or disassembly of the edge strip and the channel section member, and changing worn filter cloths can be time-consuming and laborious, presenting significant risk of physical injury when pulling the beading out of the slot.

It is an object of the invention to provide a filter cloth retaining arrangement which can simplify the operation of insertion and removal of the edge structure of the filter cloth whilst maintaining firm retention of the filter fabric.

According to the invention apparatus for retaining a filter cloth comprises an edge strip member for connection to a filter cloth edge region, the edge strip member having an elongate body extending therealong, said body having means for engaging a complementary part of a frame member, and pressure exerting means for pressing said body into engagement with said complementary part.

The edge strip member may receive the edge of the filter cloth between two flaps and be secured between the flaps by stitching, welding or adhesive, or these may be extruded onto the edge strip. The elongate body is preferably formed integrally with the flaps, and may be a generally rectangular cross-sectioned bead having a groove formed towards the filter cloth side which is shaped and dimensioned to fit  
5 with a projection directed away from the filter cloth, and formed on the frame member and comprising said complementary part.

The pressure exerting means may be separate from or formed with or connected to the elongate body. It may act as a wedging member inserted with the  
10 elongate body within a channel formed in the frame member to push the body into engagement under pressure with one or both opposite sides of the channel.

Alternatively, the pressure exerting means may be mounted, perhaps removably, to provide a channel wall opposite to the complementary part. For example in this case the pressure exerting means may comprise a resilient strip  
15 connected by a rib or series of press studs to the frame member.

A further form of pressure exertion means may comprise a tapering wedge sectioned strip which can be inserted in a tapered slot in the elongate body, the wedge sectioned strip being expansible or of larger dimensions than the slot so that the elongate body is forced against the opposite side walls of a channel in the frame  
20 member. The strip and the slot may be formed to provide a "keyhole" cross section, that is present a head separated from the main tapered body of the strip by a construction.

In a yet further form of apparatus for retaining a filter cloth, the elongate body may be formed as a bead having an elliptical cross-section, which can be rotated

between a first position where the minor axis is presented to enter into the orifice of a channel in the frame member, and a second position wherein the major axis is presented to the orifice, causing the bead to engage with abutment surfaces to resist drawing out from the orifice. The pressure exerting means comprises a flat rigid core member of metal or rigid plastics for example, within the body of the bead and  
 5 extending there along, and lying on the major axis of the bead.

~~In a further version a frame member, between two adjacent filter screens, may~~  
 comprise a wide channel in which is received edge strips provided on the edges of two oppositely directed filter cloths, each with a respective elongated body therealong,  
 10 which are received in the channel back-to-back, each with a groove which is hooked over an inwardly directed lip of the channel, and secured in place by a common resilient wedging strip between them. This common wedging strip which provides pressure exerting means pressing the elongated bodies into engagement with their respective channel lips, may have a groove on its inner (or lower) side which engages  
 15 with a rib or series of ball like studs on the floor of the channel to spread the wedging strip outwards to exert pressure on the elongated bodies. The wedging strip may be provided with a plurality of spaced tabs or a rib on the exposed face of the strip to enable the wedging strip to be removed for changing of the filter cloths. Alternatively, the wedging strip may have a head strip which overlies the gap between  
 20 the edge strips.

A number of embodiments of apparatus for retaining filter cloths according to the invention will now be described by way of example with reference to the accompanying drawings, wherein:-

- Figure 1 is a cross sectional view of part of a frame member in a rotary disc or drum filter including a first embodiment of apparatus according to the invention for retaining a filter cloth;
- Figure 2 is a view similar to Figure 1 showing a second embodiment of apparatus according to the invention for retaining a filter cloth;
- Figure 3 is a view similar to figure 1 showing a third embodiment of apparatus according to the invention for retaining a filter cloth;
- Figure 4 is a view similar to Figure 1 showing a fourth embodiment of apparatus according to the invention for retaining a filter cloth;
- Figure 5 is a sectional view of a modified frame member, for retaining two filter cloths back-to-back and showing apparatus according to the invention adapted to retain two filter cloths, and
- Figure 6 is a sectional view of a further embodiment of a modified frame member for retaining two filter cloths back-to-back, including apparatus according to the invention to retain the two filter cloths.

Referring first to Fig. 1, a filter cloth 10 of known constitution is disposed over a perforated screen 11 of for example a sector of a flat rotary disc filter. The edge of the filter cloth 10 is secured in an edge strip 12 of an edge member, in known manner, that is between a pair of flaps and using stitching adhesive or welding, or any combination thereof. The edge member also consists of an elongate body 14 which is integrally formed with the edge strip 12. These features are common to the embodiments of Figs. 1 to 3 and are given the same reference numerals therein and will not be separately described.

In Fig. 1, elongate body 14 is of generally square cross section and is formed with a groove 15 which is directed towards the direction of the filter cloth 10. This groove 10 is engaged or hooked over a rib 16 formed on a front wall 17 of a frame member 18. This frame member 18 also provides a base web 19, which has a rib 20 formed upstanding thereon, with a wider upper edge 21. Rib 20 carries a pressure exerting member in the form of a stopper or security element 22 of a resilient material with a groove corresponding in shape and dimensions to the rib 20. The stopper or security element 22 is dimensioned so as to firmly urge the elongate body 14 against the rib 16 on the frame member and thereby effect firm retention of the edge member on the frame, and thus of the filter cloth 10.

A filter cloth can be replaced by simply removing the element 22 from the rib 20, which then allows the edge member to be disengaged from the rib 16.

In Fig. 2, the frame member 18 is formed as a channel section member having a rear wall 23. The security element 22 is formed integrally with the elongate body 14 of the edge member, and connected thereto by a flexible web 24. The element 22 may be inserted between the body 14 and the rear wall 23 thereby forcing the body 14 into engagement with the rib 16, and thus preventing accidental displacement of the edge member and thus securely mounting the filter fabric 10 with respect to the frame 18. The security element 22 may be pulled out using the web 24, to free the body 14 and thus enable the edge member to be removed from the frame 18 and allow changing of the filter cloth 10.

Fig. 3 shows a further embodiment of the invention wherein the frame member 18 is formed as a channel with a rear wall 23. The elongate body 14 is received in the channel with the groove 15 engaging the rib 16, and the body 14 is



formed with a key-hole sectioned groove 28 into which a key-hole sectioned wedging member 25 is inserted.

The groove 28 and member 25 widen towards the top, and the key-hole shape is formed by a wider part or bead 26 of the member connected to the main wedge shaped part of the member 25 by a constriction 27. The member 25 is ideally somewhat larger than the groove 28, so that when inserted it exerts outward pressure, forcing the body 14 into contact both with the rear wall 23 and the rib 16. Again, the member 25 can be removed from the groove 28 to thereby enable the body 14 to be removed from the channel of frame member 18 to facilitate changing of filter fabrics

10 10.

Fig. 4 shows a somewhat different embodiment wherein the body 14 is an elliptical sectioned bead on the edge strip. When the minor axis of the ellipse is horizontal the body 14 can be easily inserted into and removed from the channel formed in frame member 18. However, on rotation through  $90^\circ$ , the major axis of the body 14 into the position as shown in the drawing is long enough to force the body into engagement between the rear wall 23 of the channel and a concave profiled surface 16a of the rib 16. In this position the body 14 is wedged tight, assisted by a rigid core member 29 which lies on the major axis, and constitutes a presser member.

15

Fig. 5 illustrates a modified embodiment suitable for receiving two filter cloth edge strips back to back as might happen with a frame member separating two panels of a filter — e.g. a radial frame member in a disc filter, instead of using two frame members such as described in any of the above embodiments in juxtaposition.

20

In Fig. 5, a frame member 30 has a first side wall 31 and a second side wall 32, separated by a base 33. Each side wall 31, 32 has a respective rib 34, 35 directed

towards the mid line of the frame member. A filter fabric 36, 37 is received at each side, being each joined to a respective edge strip 38, 39 by known means. Each edge strip 38, 39 includes a longitudinally extended member 40, 41, with a channel or groove 42, 43 directed outwardly toward the respective fabric, and fitting over the  
 5    respective rib 34, 35 of the frame member.

The edge strips 38, 39 are secured in the channel, separated and wedged by a security strip 44 of resilient material which has a groove 43 in its lower surface which engages with spaced domes or buttons 46 on the base 33 of the channel, along the centre line thereof – e.g. 200mm intervals. These help to spread the security strip 42  
 10    to improve the wedging or pressure action, and may be replaced if desired by a rib of similar cross section along the centre line of base 33.

Tabs 45 are similarly spaced at 200mm intervals along the top or exposed face of strip 42, and can be used to extract the strip 42 from between the members 40, 41 as a first step to removal and replacement of the filter cloths.

15    Figure 6 shows a further embodiment of the invention for retaining two filter cloth edge strips back-to-back. A frame member 50 provides a channel 51 with opposed side walls 52, 53 which provide respective ledges 54, 55 to rest the edges of perforated screens 11, and inwardly turned lips 56, 57 upon which filter cloth edge strips 58, 59 having grooves therein are received. The edge strips each retain the  
 20    edges of respective filter cloths 50, 51.

The space between the edge strips is filled by a push-in locking strip 62, having in cross-section a shank 63 with a wider bead 64 therein which engage in grooves in the edge strips, and a head part 65 to overlie and seal the gap between the

edge strips and also permit ease of pushing the locking strip into the space between the edge strips.

Clearly other embodiments are possible within the scope of the invention, and the invention is not limited to the details of the embodiments shown and described in

5 the foregoing.

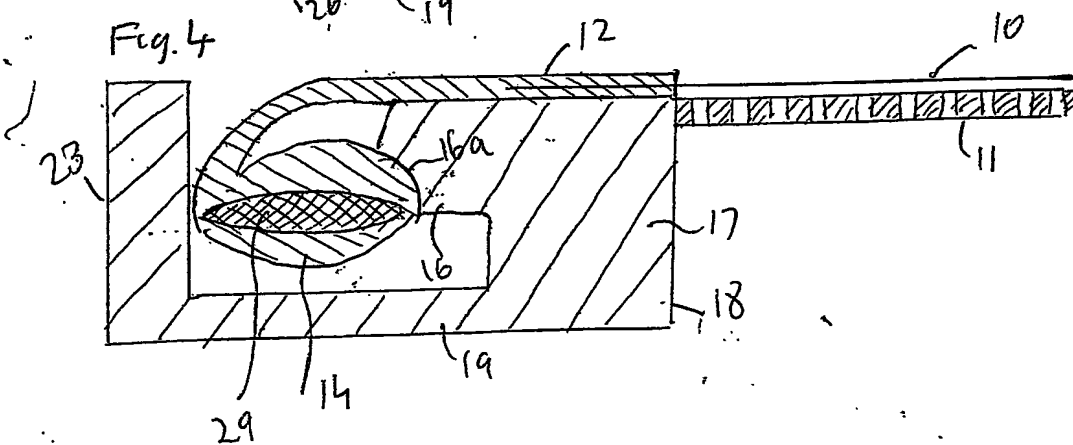
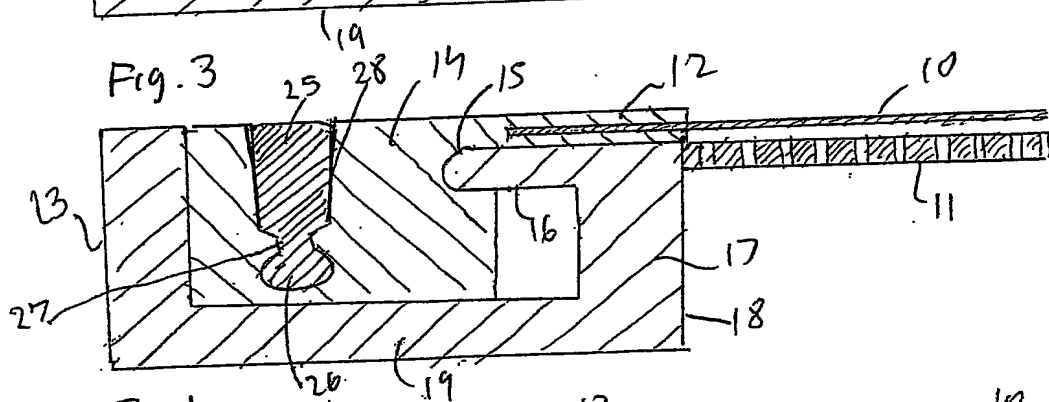
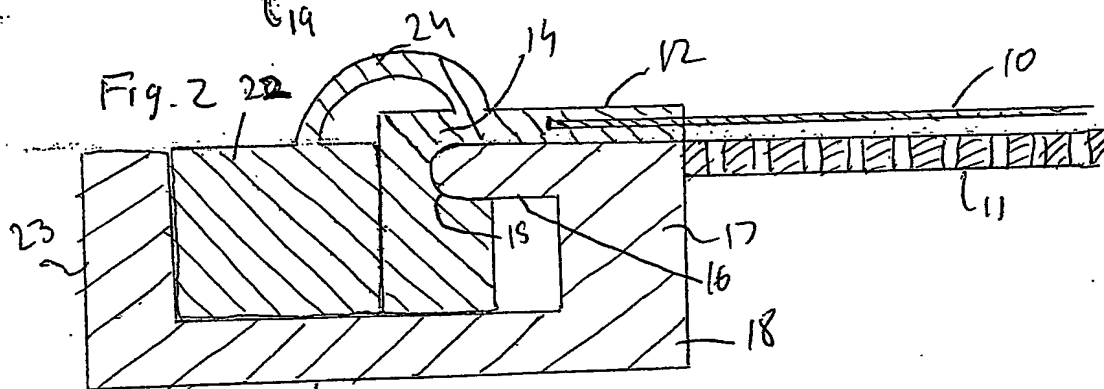
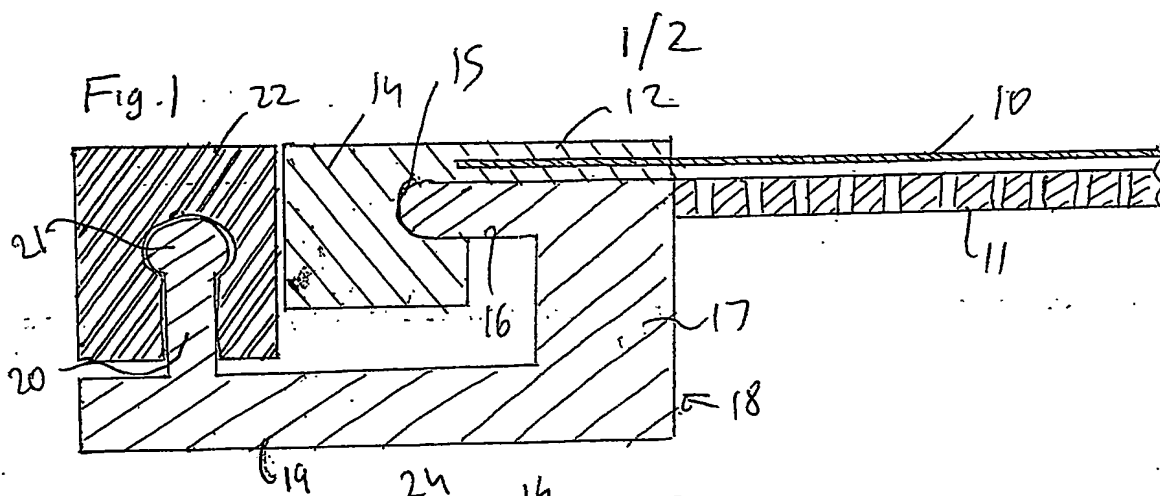


Fig. 5

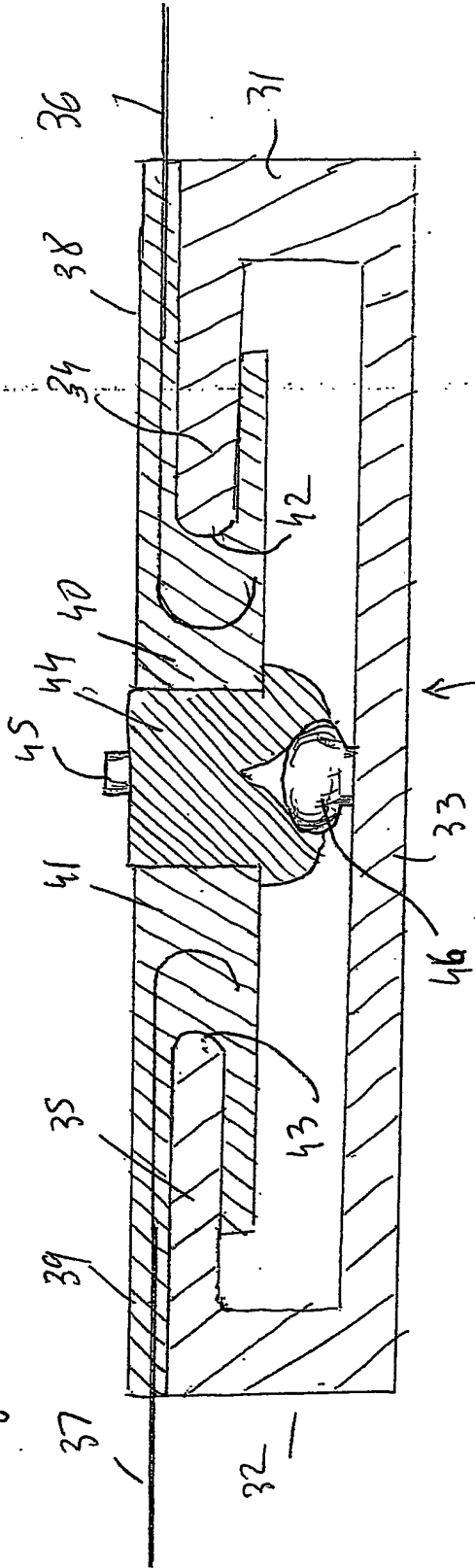
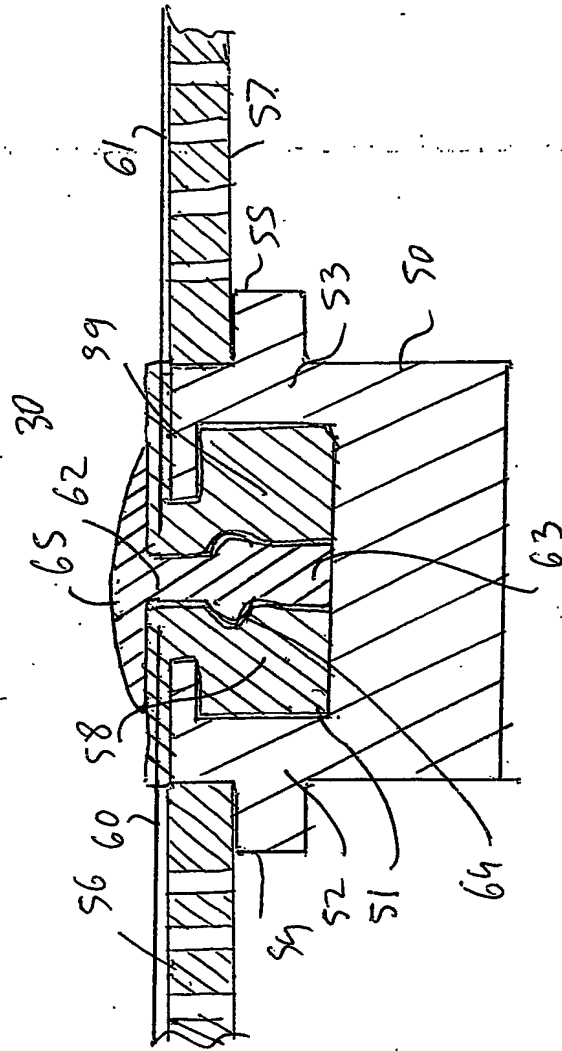


Fig. 6



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